BrightSign User Guide

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Introduction

The Roku BrightSign HD600 is a complete standalone Digital Sign or Kiosk Controller that can play content from standard Flash memory cards or over an Ethernet network. BrightSign can be used in looping or interactive modes while displaying video and images on almost any standard or high definition display.   It has no moving parts, is completely digital, is compatible with standard media authoring software, and is very reliable.   It is intended as a key component of a kiosk, tradeshow display or retail display, and can often be used to replace a PC. Reliability, durability, and flexibility in playing video, audio, and photos make it ideal for other applications as well

Examples

Here are some examples of what you can do with a BrightSign:
- Display a looping video
- Display a looping slide show in high definition
- Play looping music
- Combine any of the above
- Create interactive displays that play video, photos, or audio in response to customers using touch screens, a USB keyboard, or a custom button board you have created.
- Play audio or music by itself, synchronized to video, or simultaneous with video

Firmware Versions

This manual describes version 1.0 of the BrightSign firmware (also known as 1.0.54). Roku plans a significant free software update in Q1 2007 that will run on existing hardware.   Watch our web site for more information.
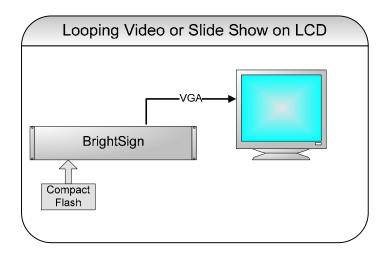
BrightSign Documentation

The complete set of BrightSign documentation is available at the www.rokulabs.com/BrightSign web site. It includes:
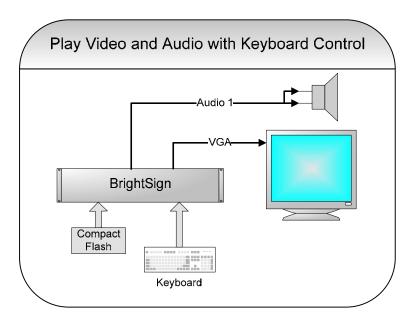
- BrightSign HD600 Installation and Regulatory Guide
- BrightSign HD600 User Guide (this document)
- BrightSign HD600 Hardware Guide
- BrightSign HD600 BrightScript Reference
- BrightSign HD600 Object Reference
- BrightSign HD600 Specifications
- Example Scripts

Example BrightSign Setups

Probably the simplest way to use BrightSign is to put a video or set of still images on a CompactFlash card, and use a VGA cable to connect the BrightSign to a flat panel monitor.   Variations on this setup include using the component out to connect to a High Definition display (like a PlasmaTV), or even connecting to a standard definition display.

As well as looping video or slides shows, you can add audio by connecting powered speakers, and you can add interactivity. In this example below, an off-the-shelf USB keyboard is connected to the BrightSign. You can also connect buttons and LEDs to the Bright Sign for a more custom solution, and soon touch screens.

Playing Media with BrightSign

Media can autoplay from a CompactFlash card, be played via a script on a CompactFlash card, or can be tested using the serial shell commands.

Auto Playing a Video File Upon Power-up

To autoplay a video file on power-up or reset, do the following:

1. Copy the video file onto the root directory of a CompactFlash card and name it "autoplay.vob". To copy files from a PC to a CompactFlash (CF) card, you may need to purchase a USB multi-card reader/writer for about $20.
2. The CompactFlash Card should be formatted as "Fat32". This is the normal case, but if for some reason your file does not play, this is one thing to check.
3. In the "1.0" BrightSign software, video files must be created with an audio track. If you don't need an audio track, use "silence". The audio out connector does not need to be connected (unless you want to hear audio).
4. Create a text file (using, for example, notepad) named "autorun.bas" with the following contents. Place autorun.bas into the root directory of your CF card (this small script can also be downloaded from roku's web site if you wish to avoid typing it in. Look for the link at www.rokulabs.com/brightsign)

```
10 REM Defaults to 640x480x60p VGA Out
20 video=CreateObject("roVideoPlayer")
30 p=CreateObject("roMessagePort")
40 ok=video.SetLoopMode(1)
50 ok=video.PlayFile("ATA:/autorun.vob")
60 msg=wait(0, p)
```

5. Insert the CF card into the BrightSign
6. Apply power
7. After a few moments, the video should play and auto loop.

Auto Playing a Slide Show Upon Power-up

The steps for this are similar to that for a video.

1. Copy the image files onto the root directory of a CompactFlash card and name them "autoplay1.bmp, autoplay2.bmp, …" . If your files are in another graphics format, convert them to bmp. For VGA, you should save them in "24 bit color" and either 640x480 or 1024x768. To copy files from a PC to a CompactFlash (CF) card, you may need to purchase a USB multi-card reader/writer for about $20.
2. The CompactFlash Card should be formatted as "Fat32". This is the normal case, but if for some reason your slide show does not play, this is one thing to check.
3. Go to www.rokulabs.com/BrightSign to find the link to download the auto-slideshow scripts. Find the format of your slide show (640x480 or 1024x768, or other), and copy that script to the root directory of your CF card with the name "autorun.bas".

4. Insert the CF card into the BrightSign
5. Apply power

6. After a few moments, the slide show should play and auto loop.

Auto Executing a Script Upon Power-Up
1. Create the script using a text editor (see the script section of this manual for more information)
2. Save it to the root directory of your CompactFlash card with the name "autorun.bas"

Media Types Supported
With the 1.0 version of the BrightSign software the following media types are supported:
- MPEG2 Video Files (aka "VOB" files). These are the same types of files that are found on DVDs. They can be authored using software such as Pinnacle Studio or iMovie. Video sizes up to D1 (720 x 480) are supported with bit rates up to approximately 6 to 8 mbps. When a video is played, it will be scaled in real time to the output resolution (which can be much higher definition).
- 24 bit .BMP files. These can be authored using almost any paint software such as Adobe PhotoShop, Macromedia Firefly, or even "Paint" which comes with Windows. Any digital camera image can be saved in or converted to this format. A variety of resolutions are supported, up to 1024x768 if outputting via VGA, or 1920x1080 (1080i) if outputting via "Component".
- MP3 audio files. With the 1.0 software, these must be at 48KHZ sampling rate.

Connectors
The BrightSign has a large number of connectors that can be used in a variety of different ways.

1. DB9 Serial Port. In this software release the serial port can be used to control a Quadrovox capacitive touch button board, or to access the shell.
2. DB25 GPIO Control Port. For connecting your own LEDs or Buttons (see the GPIO Control Port section of this manual)
3. Line Level Audio Outputs and SPDIF. When audio is playing back (either by itself or as part of a video), it can be directed to any one of these audio outputs, or to SPDIF, or to USB Speakers. This allows you to control multiple sets of speakers from one BrightSign.
4. Two USB Host Ports. Connect USB Speakers or USB Keyboards. More device support will be added in the 1.1 software update (see the section on the 1.1 update in this manual)
5. VGA and Component. Drive a VGA monitor in various modes up to 1024x768. The three Component outputs can be configured to drive a Component TV in 480p, 720p, or 1080i modes, or to generate S-Video, or NTSC or PAL composite (out the Y jack). See the Object Reference manual, "roVideoMode" for more information, or the Shell 'videomode' command.
6. Ethernet. This 10/100 port will be enabled in the next software update.

Device Software and Upgrading

The BrightSign HD600 is pre-programmed with two primary software images: a "Safe Mode" and a "Run Mode".   The Safe Mode software image is write protected, and not changed once programmed by the factory. Its main purpose is to validate that the run mode rom image is not corrupt, and boot the unit. In addition, it can upgrade or re-program the main run-mode rom image.

The main run mode software image is stored on a flash rom and may be upgraded in the field.   Roku is always working on improving the BrightSign software, so you should check our web site for possible upgrades.   To upgrade the BrightSign run-mode rom follow these steps:

1. Download the file from rokulabs.com
2. Copy it to a CompactFlash card using your PC and a standard CompactFlash Card reader/writer. These usually connect to your USB port.
3. Name the upgrade file either "update.rok" or "update-save.rok". "update.rok" will auto-delete after the upgrade is complete. This is useful if you want to distribute the update to the field on the same CF card that contains the display content. In this mode, after the first boot, the unit will no longer upgrade, but will continue to autorun any auto-run content on the CF card.   If named "update -save.rok" the file will not be auto-deleted. This is useful for using the same CF card to upgrade multiple BrightSigns.
4. Insert the CF card into the BrightSign
5. Apply Power to the BrigthSign.
6. Wait. If a display is connected it will be blank. After several seconds one of the LEDs on the front panel will start to flash. Once it completes flashing, the upgrade is complete. If you are using the " update.rok" method, the unit will then reboot as normal.

Note that the upgrade process is very safe. If for some reason it fails, for example a power failure in the middle of the update, the unit's "safe-mode" will still boot and will still perform upgrades as above.

BrightSign Shell

BrightSign has a command line shell that can be accessed via the serial port. The shell allows you to type in commands to trigger tasks such as running scripts, playing video, trying different video modes, etc. It is not required that you use the shell. You can simply put your content on a CF card and configure it to auto play on power-up.

You may find it useful to use the shell to test various options or for debugging scripts. Follow these steps to access the shell:

1. Connect the DB9 connector on the BrightSign to your PC's Serial Port using a "null modem cable" (available at Frys, RadioShack, etc).
2. Run a "terminal emulator", such as HyperTerminal on Windows XP (Start | All Programs | Accessories | Communications | HyperTerminal.)

3. Configure the terminal for: 9600 baud, 8 data bits, no parity, 1 stop bit, NO flow control, "TTY mode".
4. Insert a CF card into BrightSign with some test files on it (24 bit BMP graphics, 48KHZ mp3 files, VOB video, etc)
5. Optionally connect speakers or VGA monitor to the BrightSign
6. Power-up the BrightSign
7. After a few moments you should see the BrightSign shell appear.
8. Type: help <enter> for a list of commands, and then type the command on a line by itself for more information on a particular command.

All files on the CompactFlash card should be referenced with an "ATA:/" in front of the filename. For example, to play a video named "myvideo.vob" on the CF card, enter this command:

```
playvideo ata:/myvideo.vob
```

For a Directory of the cards contents use:

```
dir ata:/
```

To change the videomode to 1024x768 outputting on the VGA port, use:

```
Videomode 1024x768x60p
```

The 1.0 version of the BrightSign software does not support "hot changing" of CompactFlash cards. You must put in the CF card before applying power.   The 1.0 software does not support the SD card slot.

Creating Interactive Displays

With BrightSign you can create displays that respond to user input. For example: give the customer options of watching different videos dependent on which button they press. To accomplish this with BrightSign, you need to decide what the input device will be, and you will need to create a script.   In addition to the 1.0 options, more options will soon be available (see the appendix in this manual).

Device Types Supported

With the 1.0 version of the BrightSign the following devices can be connected to a BrightSign.
- Many brands of USB Keyboards
- Many brands of USB Speakers
- Quadravox Serial Button Board
- Any "GPIO" button or LED (your custom board or display)
- VGA Monitors
- NTSC, PAL, and High Definition Monitors/TVs

- Speakers/Amplifiers with stereo line-level inputs
- Audio playback devices with SPDIF optical digital audio input
- PC via Serial Port
- IR Remote Control using the "NEC" protocol. A compatible remote can be purchased from Roku.

Scripts

BrightSign can be used without any knowledge of scripts to accomplish common but simple goals such as playing looping video or playing a slideshow (see the prior section in this manual "Playing Media"). By adding scripts, you can create more interactive digital signs or kiosks.

A script is a simple program that controls behaviors, like video playback, based on events such as button presses. Scripts are also commonly used on PCs and Web Sites. For example, Microsoft Office "macros" are often Basic Scripts. Adobe Flash apps often rely on ActionScripts for their logic, and web pages are often driven by scripts written in PHP, Perl, or JavaScript. If you don't have scripting skills in-house, IT and Web developers can be contracted to write scripts for you.   Roku can also be contracted to develop custom scripts and applications (contact sales@rokulabs.com).

BrightSign has a built in scripting language (called BrightScript), similar in many ways to the Basic found in Microsoft Office, or Windows XP "Windows Script Hosting" VBScript.

Scripts can be as simple as one or two lines, and as complicated as hundreds of lines.

Hello world

Here is how to create your first, very simple script

1. Using a text editor create a file called "hello.bas" with this line:

   ```
   print "hello world"
   ```

2. Save "hello.bas" into the root directory of a CF card
3. Insert the CF card into BrightSign
4. Connect the serial port of BrightSign to you PC using a null modem cable, and run hyperterminal (see the "Shell" section of this manual for more details).
5. Power up BrightSign.
6. Wait for it to boot, and for the "Roku>" shell prompt to appear
7. type: `script ata:/hello.bas`
8. You should see "hello world" on your terminal window.
9. If you want the script to autorun upon boot, rename it "autorun.bas"

Roku Objects

Take a look at the section of this manual titled "Auto Playing a Video Upon PowerUp". It shows a simple five line script to autoplay a video, looping. You'll see it uses the CreateObject() function. This creates a Roku Object. These "objects" provide access to all of BrightSign's features: playing video, playing images, etc.

There are two other manuals that you'll need to refer to when writing scripts:
- BrightSign HD600 BrightScript Reference -- this describes the actual scripting language
- BrightSign HD600 Object Reference -- this describes the Roku Objects, such as "roVideoPlayer"

Examples

A good way to learn BrightScript is to look at or modify existing scripts. You can find links to example scripts at www.rokulabs.com/brightsign.

GPIO Control Port

The BrightSign has a DB25 General Purpose Input Output (GPIO) Port. This port has 12 inputs that can be directly connected to buttons or switches, and 6 outputs that can directly drive LEDs. To use this port you must create a simple but custom cable that connects a DB25 connector to your buttons or LEDs. See the BrightSign Hardware Manual for more information and example circuits. Roku has a test button/LED board that you can purchase to evaluate the GPIO port and test your scripts that read the buttons or set the LEDs.

Here is an example script that will flash an LED for half a second each time a button is pressed on the BrightSign button/led board. Note: line numbers are optional, but are included here to label each line.

```
100 print "BrightSign Button-LED Test Running"
110 p =   CreateObject("roMessagePort")
120 tmr = CreateObject("roMessagePort")
130 gpio =  CreateObject("roGpioControlPort")
140 gpio.SetPort(p)
142 sw = CreateObject("roGpioControlPort")
147 sw.SetPort(p)
150 LED1=2 ^ 17
160 LED2=2 ^ 18
170 LED3=2 ^ 19
180 LED4=2 ^ 20
190 LED5=2 ^ 21
200 LED6=2 ^ 22
210 dim idx(5):idx(0)=LED1:idx(1)=LED2:idx(2)=LED3:idx(4)=LED5:idx(5)=LED6
220 msg=wait(0, p)
230 if type(msg)<>"roGpioButton" then 220
240 butn = msg.GetInt()
250 if butn > 5 then 220
255 sw.SetOutputState(butn+17,1)
260 print "Button Pressed: ";butn
```

```
270 msg = wait (500, tmr)
280 sw.SetOutputState(butn+17,0)
290 msg=p.GetMessage():if type(msg)<>"rotINT32" then 290
300 goto 220
```

Learning More and Support

The following resources can help you get the most from your BrightSign:

1. Visit www.rokulabs.com/brightsign
2. Refer to each of the different BrightSign documents available (listed at the start of this manual).
3. Visit the BrightSign community Forums to discuss projects with other customers and Roku engineers: www.rokulabs.com/forums
4. Contact sales@rokulabs.com for help with custom projects